

WHAT IS CLAIMED IS:

1. A surface acoustic wave apparatus comprising:
a piezoelectric substrate;
at least one longitudinally-coupled-resonator surface acoustic wave filter including at least three interdigital electrode transducers provided on said piezoelectric substrate along the propagation direction of surface acoustic waves; and
at least one surface acoustic wave resonator that is connected in series to at least two of the at least three interdigital electrode transducers of the longitudinally-coupled-resonator surface acoustic wave filter; wherein
the parasitic capacitance between the longitudinally-coupled-resonator surface acoustic wave filter and the surface acoustic wave resonator is set to about $6.5 \times 10^2/f_0$ [pF] or less, where f_0 represents the center frequency, in megahertz, within the pass band of the longitudinally-coupled-resonator surface acoustic wave filter.
2. A surface acoustic wave apparatus according to Claim 1, wherein the longitudinally-coupled-resonator surface acoustic wave filter includes reflectors;
among the interdigital electrode transducers of the longitudinally-coupled-resonator surface acoustic wave filter, each ground terminal of all the interdigital electrode transducers other than the interdigital electrode transducers that are connected to the surface acoustic wave resonator and the interdigital electrode transducers that are adjacent to the reflectors is connected to only one electrode pad; and
ground-side interdigital electrodes of the interdigital electrode transducers other than the interdigital electrode transducers that are connected to the surface acoustic wave resonator and the interdigital electrode transducers that are adjacent to the reflectors are connected to each other via electrode fingers.
3. A surface acoustic wave apparatus according to Claim 1, wherein the longitudinally-coupled-resonator surface acoustic wave filter includes five interdigital electrode transducers.
4. A surface acoustic wave apparatus according to Claim 1, wherein, in the longitudinally-coupled-resonator surface acoustic wave filter, bus bars of interdigital electrodes are thinner in areas where signal-side interdigital electrodes of the interdigital

electrode transducers that are connected to the surface acoustic wave resonator are adjacent to ground-side interdigital electrodes of the interdigital electrode transducers that are adjacent to the interdigital electrode transducers connected to the surface acoustic wave resonator than in other areas of the interdigital electrodes.

5. A surface acoustic wave apparatus according to Claim 1, further comprising at least one insulating layer that is provided between the piezoelectric substrate and at least one of an electrode pad arranged at the side to which the surface acoustic wave resonator is connected, the electrode pad being connected to the ground terminal of the interdigital electrode transducer of the longitudinally-coupled-resonator surface acoustic wave filter, a ground line connecting the ground terminal of the interdigital electrode transducer to the electrode pad, and signal lines connecting the longitudinally-coupled-resonator surface acoustic wave filter and the surface acoustic wave resonator.

6. A surface acoustic wave apparatus according to Claim 1, wherein the surface acoustic wave apparatus includes a balanced-to-unbalanced conversion function.

7. A surface acoustic wave apparatus according to Claim 1, wherein the piezoelectric substrate is housed in a package in a face-down arrangement.

8. A surface acoustic wave apparatus according to Claim 1, wherein the piezoelectric substrate is made of X-propagation LiTaO_3 that is Y-cut at $40 \pm 5^\circ$

9. A communication apparatus comprising the surface acoustic wave apparatus according to Claim 1.

10. A surface acoustic wave apparatus comprising:
a piezoelectric substrate;
at least one longitudinally-coupled-resonator surface acoustic wave filter including at least three interdigital electrode transducers provided on said piezoelectric substrate along the propagation direction of surface acoustic waves;
at least one surface acoustic wave resonator that is connected in series to at least two of the at least three interdigital electrode transducers of the longitudinally-coupled-resonator surface acoustic wave filter;

signal lines connecting in series said at least two of the at least three interdigital electrode transducers of the longitudinally-coupled-resonator surface acoustic wave filter to the surface acoustic wave resonator, said signal lines being arranged to surround a ground-side electrode pad connected to an interdigital electrode transducer of the longitudinally-coupled-resonator surface acoustic wave filter; and

characteristic selection pads connected adjacent to electrode pads other than said ground-side electrode pad.

11. A surface acoustic wave apparatus according to Claim 10, wherein the longitudinally-coupled-resonator surface acoustic wave filter includes reflectors;

among the interdigital electrode transducers of the longitudinally-coupled-resonator surface acoustic wave filter, each ground terminal of all the interdigital electrode transducers other than the interdigital electrode transducers that are connected to the surface acoustic wave resonator and the interdigital electrode transducers that are adjacent to the reflectors is connected to only one electrode pad; and

ground-side interdigital electrodes of the interdigital electrode transducers other than the interdigital electrode transducers that are connected to the surface acoustic wave resonator and the interdigital electrode transducers that are adjacent to the reflectors are connected to each other via electrode fingers.

12. A surface acoustic wave apparatus according to Claim 10, wherein the longitudinally-coupled-resonator surface acoustic wave filter includes five interdigital electrode transducers.

13. A surface acoustic wave apparatus according to Claim 10, wherein, in the longitudinally-coupled-resonator surface acoustic wave filter, bus bars of interdigital electrodes are thinner in areas where signal-side interdigital electrodes of the interdigital electrode transducers that are connected to the surface acoustic wave resonator are adjacent to ground-side interdigital electrodes of the interdigital electrode transducers that are adjacent to the interdigital electrode transducers connected to the surface acoustic wave resonator than in other areas of the interdigital electrodes.

14. A surface acoustic wave apparatus according to Claim 10, further comprising at least one insulating layer that is provided between the piezoelectric substrate and at

least one of an electrode pad arranged at the side to which the surface acoustic wave resonator is connected, the electrode pad being connected to the ground terminal of the interdigital electrode transducer of the longitudinally-coupled-resonator surface acoustic wave filter, a ground line connecting the ground terminal of the interdigital electrode transducer to the electrode pad, and signal lines connecting the longitudinally-coupled-resonator surface acoustic wave filter and the surface acoustic wave resonator.

15. A surface acoustic wave apparatus according to Claim 10, wherein the surface acoustic wave apparatus includes a balanced-to-unbalanced conversion function.

16. A surface acoustic wave apparatus according to Claim 10, wherein the piezoelectric substrate is housed in a package in a face-down arrangement.

17. A surface acoustic wave apparatus according to Claim 10, wherein the piezoelectric substrate is made of X-propagation LiTaO_3 that is Y-cut at $40 \pm 5^\circ$

18. A communication apparatus comprising the surface acoustic wave apparatus according to Claim 10.